U.S. DEPARTMENT OF AGRICULTURE
GRAIN INSPECTION, PACKERS AND STOCKYARDS ADMINISTRATION
FEDERAL GRAIN INSPECTION SERVICE
STOP 3630
WASHINGTON, D.C. 20090-3630

CHAPTER 2

LABORATORY SAFETY

2.1 WORK AREA REQUIREMENTS

The work area requirements covered under this section apply to FGIS-occupied space only.

a. Sample Grinding Area.

Samples must be ground in space separate from the analytical space. The field office manager and safety officer must determine whether added ventilation or a dust removal device is needed in the grinding area to remove airborne dust particles. Refer to the FGIS Safety and Health Office in Washington, D.C. for assistance in determining whether added dust removal equipment (e.g., exhaust fan) is required.

b. Sample Testing Area.

Test methods that involve the use of volatile chemicals (e.g., acetonitrile, methanol) must be performed in FGIS-approved laboratory space. Testing methods that are free from hazardous materials may be performed (upon approval of the field office manager) in alternate locations. The field office manager and safety officer must evaluate the testing materials to determine if FGIS-approved laboratory space is required. If testing is performed in an alternate location (i.e., table-top in inspection lab), consideration must be given to lighting, plumbing, electrical, and ventilation requirements. Refer to the FGIS Safety and Health Office in Washington, D.C. for assistance in determining if FGIS-approved laboratory space is required and whether added ventilation (e.g., exhaust fan) is required for alternate testing locations.

2.2 FGIS LABORATORY REQUIREMENTS

FGIS-approved laboratories are required for mycotoxin testing that involves the use of hazardous materials (e.g., flammable liquids). The requirements covered under this section apply to FGIS-occupied space that is dedicated for the sole function of mycotoxin testing.

Some DON testing methods require the use of flammable liquids and suspected carcinogens. The building owner (private or GSA) must permit the use of chemicals (e.g., acetonitrile, methanol) in space used by FGIS. FGIS will provide testing services onsite only in facilities that provide protection to FGIS personnel.

Individual elevators may provide two kinds of space for FGIS personnel to perform onsite DON testing. The space may be located (1) in a building along with other occupants, or (2) in a building devoted exclusively to laboratory space.

In either case, the plan for the intended laboratory space is subject to inspection and approval by FGIS prior to construction. The Safety and Health Office and field office manager will review proposed plans and suggest ways to comply with the requirements.

The following are minimum requirements for FGIS-occupied laboratory space.

a. Location.

Locate the laboratory at least 100 feet from the base of the elevator headhouse. This distance is subject to negotiation when the elevator uses exterior grain legs and/or inclined belts in lieu of interior grain legs or where the headhouse is equipped with blow-out panels or the headhouse consists of a lightly covered framework.

Laboratories must meet the following requirements when they are located in a building with other occupants:

(1) Isolate the laboratory from nonlaboratory occupants using a fire barrier having at least a 1-hour fire resistance.

(2) Provide a fire barrier consisting of floors, ceilings, and interior walls.

(3) Provide all passageways and other openings that lead to adjacent interior space with self-closing fire doors having a 1-hour fire resistance. Do not block these doors open.

(4) Separate the space from central heating, ventilation, and air-conditioning using automatic-closing fire dampers in the heating, ventilation, and air-conditioning ducts near the fire-barrier, or provide a separate heating, ventilation, and air-conditioning system in the laboratory.

b. Size.

Dedicate the space strictly for laboratory (chemical) work. Supply adequate space for chemical analysis (minimum of 100 square feet).

c. Electrical System.

Provide the laboratory space with electrical power and lighting meeting the standards of the National Electrical Code. Wiring suitable for Class I location is not required. A three-wire system consisting of an energized wire, a neutral wire, and a grounding conductor is satisfactory. Install overhead lighting fixtures through ceilings that serve as fire barriers. Fixtures suspended below such ceilings are acceptable.

d. Plumbing.

Provide the laboratory space with a basin having hot and cold potable water and a sewer connection.

e. Exhaust System.

The exhaust system must remove chemical vapors from the work area. Normal air conditioning and heating may provide adequate ventilation when performing testing procedures in a building devoted exclusively for laboratory space. Refer to the FGIS Safety and Health Office in Washington, D.C. for assistance in determining whether added ventilation, such as a fume hood, is needed. If needed, situate the laboratory space so that hoods are vented to the exterior of the building. Fume hood ventilation will require a 6 or 8 inch diameter opening, either vertically through the ceiling and roof or horizontally through an exterior wall. In some cases, a portable hood may be sufficient.

f. Eyewash and Safety Shower Station.

Provide the laboratory space with eyewash equipment (eyewash bottle or permanent faucet-mounted fixture). A permanent, faucet-mounted eyewash fixture is highly recommended. A safety shower station must be installed in laboratories where acetonitrile-based extraction solvent (Romer-Fluoroquant test method) is used.

g. Cautionary Markings.

(1) Provide signs for the laboratory door(s) as follows:

(a) "Biohazardous Material Present"

(b) "No Smoking, Eating, or Drinking"

(c) "Flammable Material Present"

(d) "Wear Safety Protection"

(e) "Admittance of Authorized Personnel Only"

(2) Provide signs for the refrigerator used for storing test kits, chemicals, or solutions, as follows:

(a) "Biohazardous Material Present"

(b) "No Food or Drink to be Stored in this Refrigerator"

For further information concerning the laboratory space requirements, contact the FGIS Safety and Health Office.

2.3 SAFETY

FGIS employees must comply with good practices to ensure a safe and efficient work environment. To accomplish this, include the following as part of an overall FGIS laboratory/testing area "Standard Operating Procedure" (SOP). Maintain the SOP, this handbook, and current Material Safety Data Sheets (MSDS) at each laboratory/testing location.

During onsite supervision at agency locations, FGIS employees must assess their personal safety requirements. If personal safety is questionable, FGIS employees must determine if personal protective equipment can be used to correct the safety deficiency at the testing location. If FGIS employees cannot utilize personal protective equipment to provide for a safe work environment, then onsite DON supervision must occur only when the testing area is considered safe.

Interested persons are restricted from entering the DON testing area during testing unless accompanied by official personnel and must observe the health and safety rules while in the area.

a. General Safety Practices.

(1) Table-Top Testing.

FGIS personnel must abide by the following safety practices when performing testing in an alternate location (e.g., table-top in inspection lab).

(a) Do not smoke, eat, drink, or chew gum or tobacco in the immediate testing area.

(b) Wash hands immediately before and after eating, drinking, and smoking.

(c) Wear the following protective equipment when testing is being performed: disposable, fire-retardant laboratory coat; disposable, impermeable gloves; safety glasses or splash goggles.

(d) Wear a FGIS-approved disposable mask and hair protection when exposed to airborne grain dust.

(e) Do not store food or drink in the refrigerator used for storing chemicals and solutions, and test kits.

(f) Do not store masks and hair protectors in the grinding area where they might become contaminated by the dust particles.

(2) Laboratory Testing.

FGIS personnel must abide by the following safety practices when performing testing in an FGIS-approved laboratory.

(a) Do not smoke, eat, drink, or chew gum or tobacco in the laboratory.

(b) Wash hands immediately before and after eating, drinking, and smoking.

(c) Wear the following protective equipment: disposable, fire-retardant laboratory coat; disposable, impermeable gloves; safety glasses or splash goggles.

(d) Wear a FGIS-approved disposable mask and hair protection when exposed to airborne grain dust.

(e) Do not wear contact lenses in the immediate testing area (if testing with acetonitrile).

(f) Do not store food or drink in the laboratory refrigerator used for storing chemicals, solutions, and test kits.

(g) Do not store masks and hair protectors in the grinding area where they might become contaminated by the dust particles.

(h) Label all bottles and containers according to the Hazard Communication Program and the Chemical Hygiene Plan. In addition, when preparing mixtures of solutions, securely apply a label with the name of the solution, the preparation date, and the preparer's initials written in permanent ink.

(i) Store equipment outside the fume hood in a manner that will not clutter bench tops or obstruct movement.

(j) Prepare all chemical solutions and perform chemical analyses under a working fume hood.

(k) Limit the total quantity of waste chemicals in the laboratory to one liquid gallon.

(l) Limit the total amount of flammable solvent (including waste) in the laboratory to two gallons.

(m) Maintain a current MSDS for each chemical in the laboratory. If each supply of chemicals received does not have an MSDS enclosed, contact the company and request one immediately.

(n) Store flammable solvents in an approved storage cabinet.

(o) Store waste chemicals (e.g., acetonitrile, methanol) in impermeable metal containers meeting Underwriters Laboratory approval for Class I liquids. The containers must be capable of maintaining a tight seal and must be labeled "Flammable" or "Biohazardous Material" or both, as applicable.

(p) Contact an Environmental Protection Agency (EPA)-approved or EPA-certified waste disposal company and make arrangements for removal of chemical wastes or provide other suitable waste disposal procedures consistent with existing laws that do not create a hazard to the community.

2.4 SANITATION REQUIREMENTS

The sanitation requirements for spillage, labware, and excess sample extract listed in this section are applicable to testing performed at an FGIS-approved laboratory or an alternate testing location (e.g., table-top in the inspection lab).

Official agencies must adhere to the requirements for cleaning labware and should follow procedures established in their area for the disposal of excess sample extract.

Perform the following procedures only while wearing disposable, impermeable gloves, chemical splash goggles, and a fire-retardant laboratory coat. If hands become contaminated, wash immediately with soap and water.

a. Spillage.

Clean areas and materials contaminated by any extraction solution spills. Wipe up the affected areas using an absorbent cloth or paper towels, then wash the area with a soap/water solution. Place cleaning materials in a plastic waste bag, close tightly, and discard in a dumpster or landfill disposal site.

b. Labware.

Prepare a solution consisting of dishwashing liquid and water. Completely submerge the used glassware, funnels, beakers, etc., wash thoroughly, then rinse with clean water before reusing.

c. Excess Sample Extract.

The disposition of excess sample extracts and solutions varies with the testing methodologies. All sample extracts containing chemicals such as methanol and acetonitrile are treated as hazardous chemicals and are disposed of in the chemical waste container. Unused extracts consisting of water only or a water/salt solution may be disposed of by pouring down the drain. Refer to the appropriate testing procedures for specific waste disposal instructions.